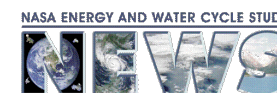


A Model-based LandFlux Contribution from NEWS
Principal Investigators: Christa D. Peters-Lidard, Mike Bosilovich,
Matt Rodell, David Mocko



Objective: Close the global water/energy budget over land.

Approaches (per 2007 Rossow summary)

(Wood): Different “formulae” approaches driven by radiation (incoming) and precip, wind, T_a & Q_a
(Lin): ET estimate from microwave index plus radiation
(Betts): Given Surface Radiation, RH and Precip, estimate Evaporative Fraction
(Houser/Rodell): Assimilation Approaches (eventually fully coupled) (force off-line land surface model = GSWP approach)
(Beljaars) – Re-analysis derived results
(Entekhabi): Straight ET estimate from bulk equations using remote sensing inputs – formulation is separated into different contributions (not veg-type dependent explicitly) – essence: radiation = sensible heat flux reduced by EF-based factor
(Basic): Bulk formulae for SH and ET with remote sensing inputs

Temporal/Spatial Grids

Standard LandFlux/WATCH WaterMIP:

20 years - 1 Jan 1980 to 31 Dec 1999

0.5-degrees

Hourly timestep

Extended LandFlux for NEWS/EOS-era:

30 years - 1 Jan 1980 to 31 Dec 2009

0.25-degrees

Hourly timestep

NEWS Model Components

Atmospheric Inputs:

- 1) MERRA 2-m/10-m diagnostics
- 2) MERRA lowest model layer
- 3) GLDAS (GDAS+TRMM3B42+SRB)

Land Surface (LIS):

- 1) Noah 2.7.1 (NCEP)
- 2) HY-SSiB (GSFC)
- 3) CLM2.0 (NCAR/CCSM)
- 4) Catchment (GMAO)
- 5) Noah 3.1 (NCAR/WRF)
- 6) CLM3.5 (NCAR/CCSM)
- 7) TESSEL (ECMWF)

Linkages with other NEWS WG

Evaporation and Latent Heating-Wood

Energy & Water Cycle Climatology-Rodell

Drought & Flood Extremes-TBD

Linkages with outside groups

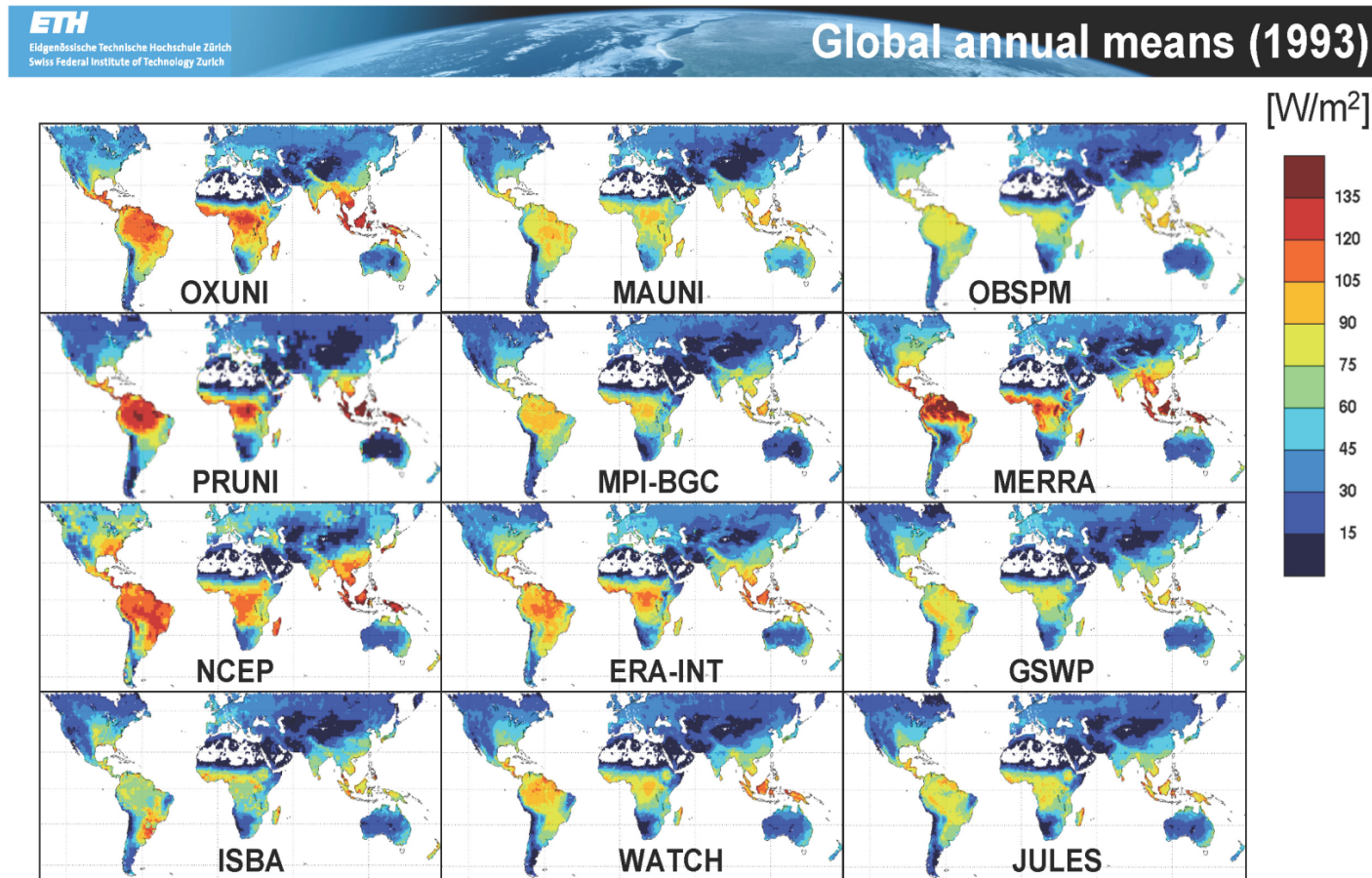
GEWEX: -GRP, GLASS, CEOP

WATCH

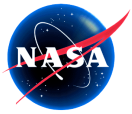
LandFlux: Single-year (1993-1995) analyses (C. Jimenez et al. as presented by Blyth)

- Remote sensing products: U. Oxford (Fisher and Tu, “OXUNI”), U. Maryland (Wang et al., “MAUNI”), Paris Observatory (Jimenez et al., “OBSPM”), U. Princeton (Sheffield et al. “PRUNI”)
- Empirical Fluxnet-based dataset (Jung, Reichstein, ...; MPI-BGC): Based on FaPAR data, CRU temperature, GPCC precip, land cover
- Land surface model output: GSWP average, ISBA (GSWP), WaterMIP average, JULES (WaterMIP)
- Reanalyses: MERRA (NASA/GSFC), NCEPDOE, ERAinterim

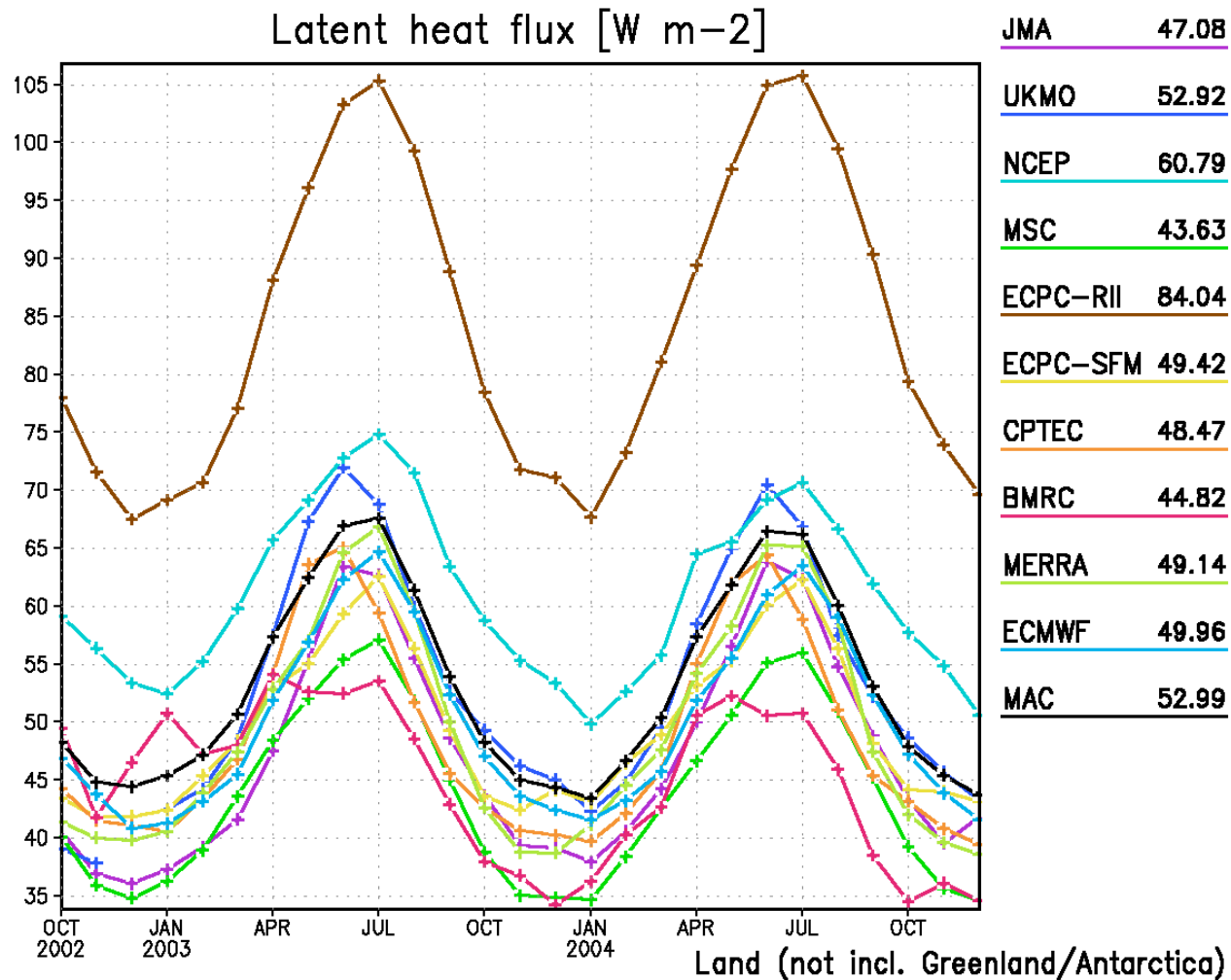
LandFlux: Single-year (1993-1995) analyses (S. Seneviratne et al. as presented by Blyth)

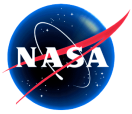


- Overall patterns look similar; dry - wet
- Some large range of values in some areas, in particular tropics

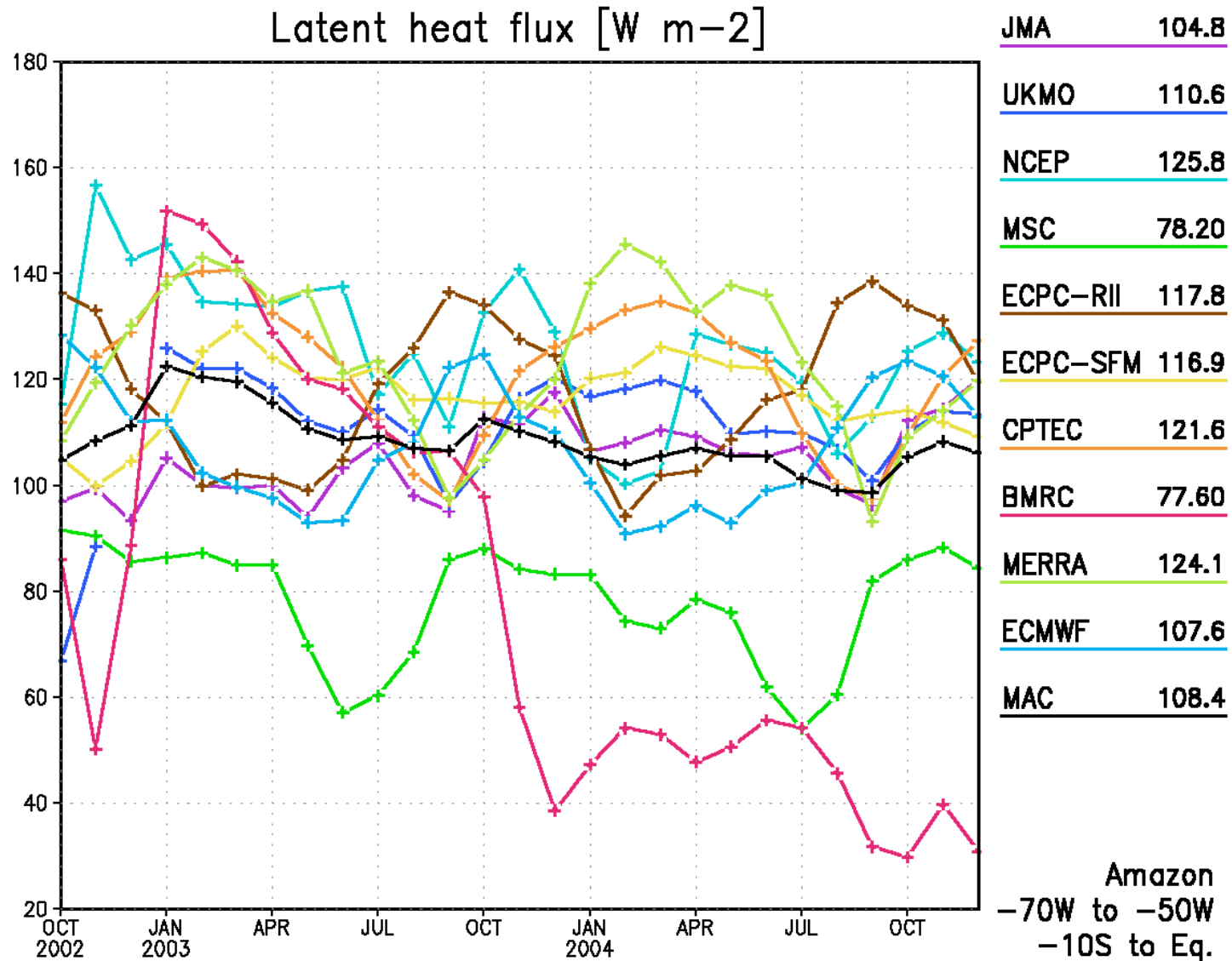


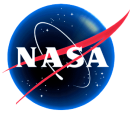
Monthly MAC Means over Land (2002-2004)





Monthly Means over Amazon

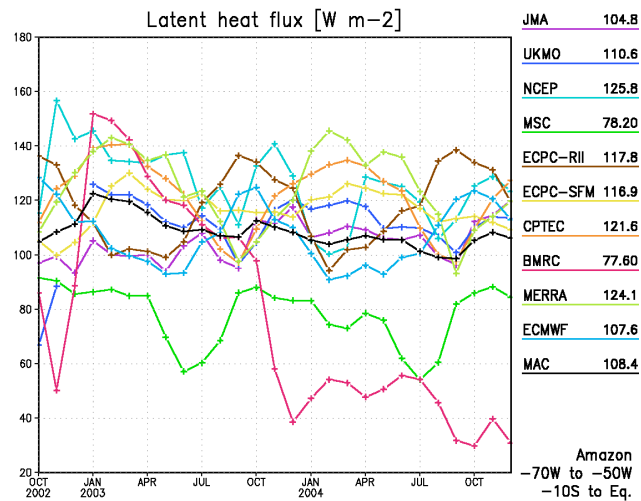




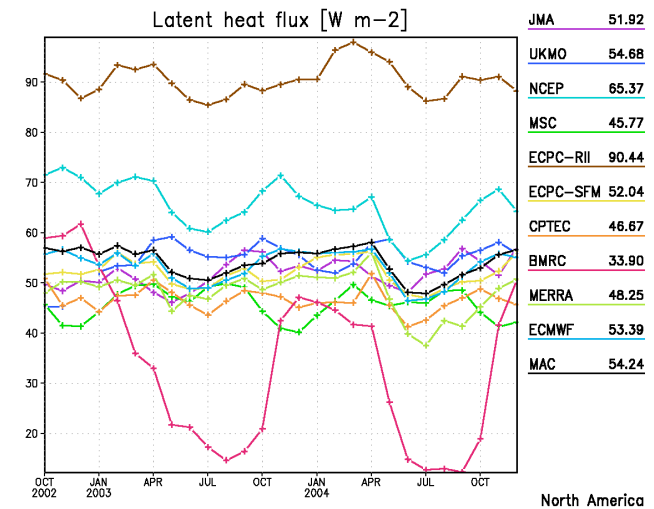
Multi-Model Analysis for CEOP (MAC) Fluxes



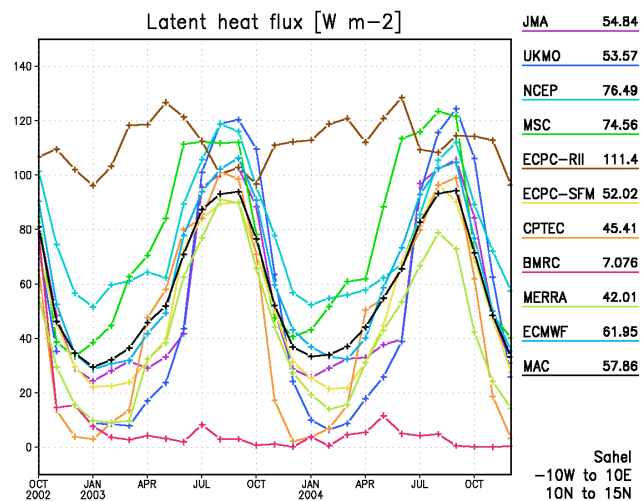
Amazon



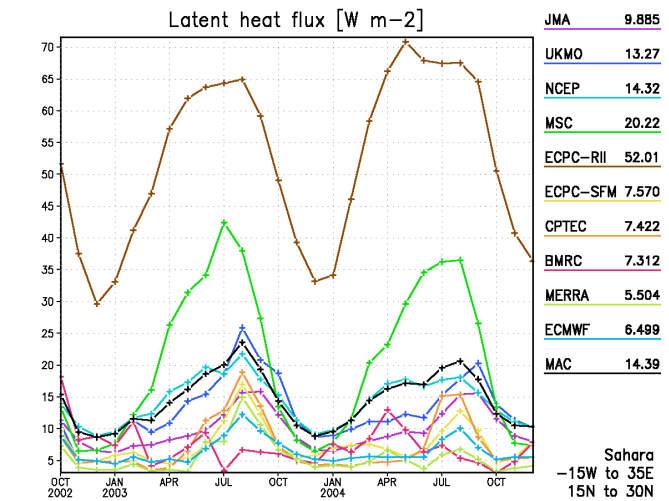
North America

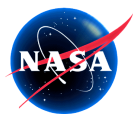


Sahel

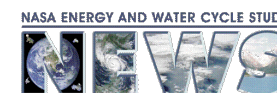


Sahara



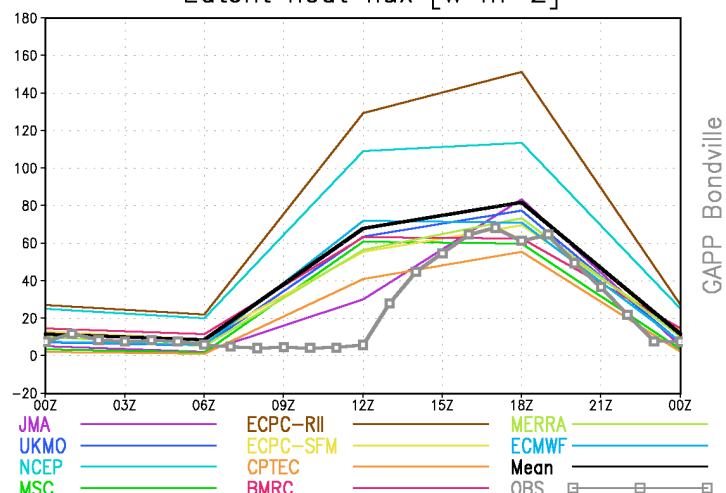


MAC & MERRA vs. CEOP Fluxes



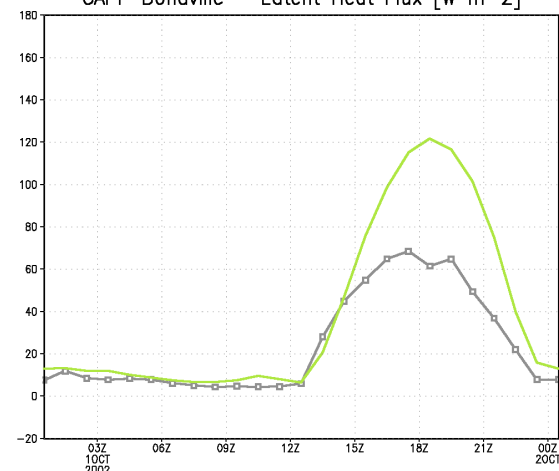
North America-Bondville

Latent heat flux [W m^{-2}]

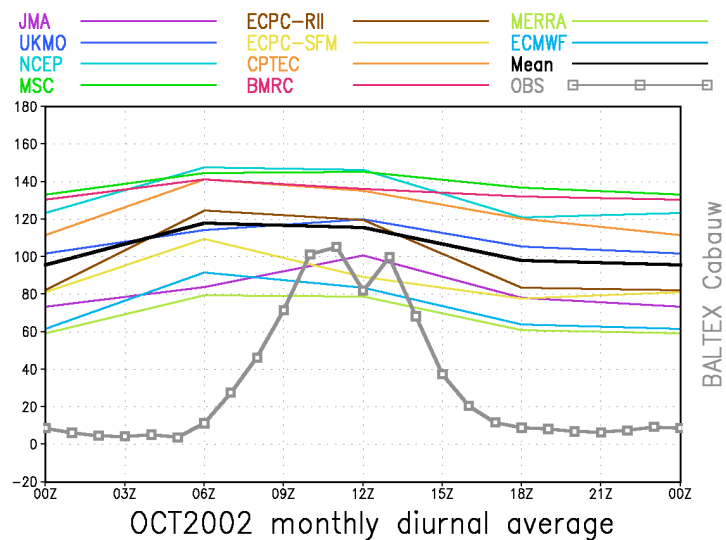


North America-Bondville

GAPP Bondville – Latent Heat Flux [W m^{-2}]

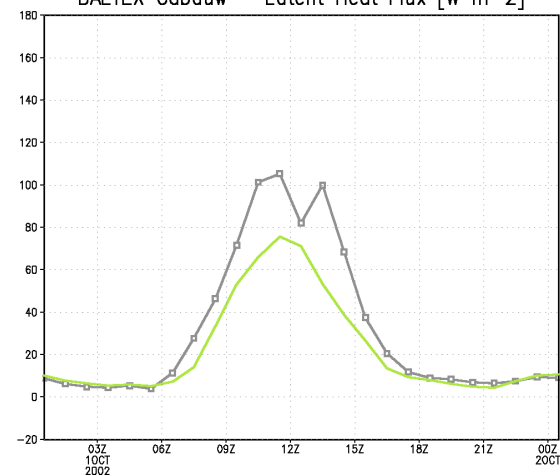


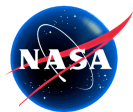
Europe-Cabauw



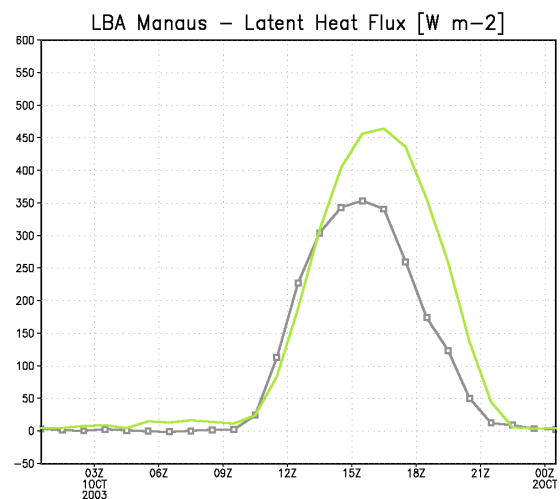
Europe-Cabauw

BALTEX Cabauw – Latent Heat Flux [W m^{-2}]

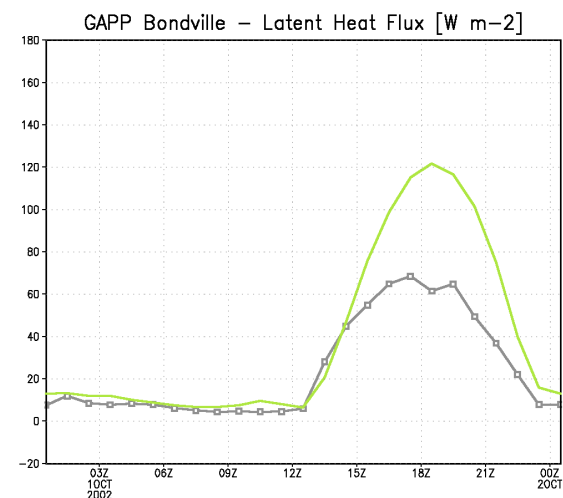




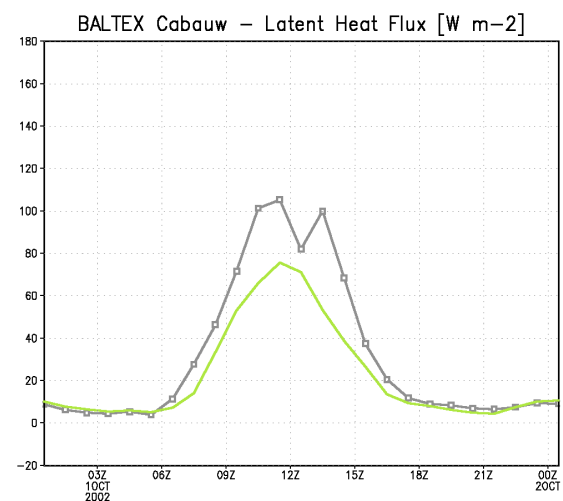
Amazon-Manaus



North America-Bondville



Europe-Cabauw



LandFlux issues for NEWS

- EU WATCH forcing dataset does not fully resolve diurnal cycle. MERRA hourly forcing should be recommended
- 0.5-degree global dataset (56 South to 84 North) 20 years of forcing:
 - The "reporting period" is 1985-1999, with a spin-up of at least 5 years (1980-1984)
 - Time resolution varies by variable, but mainly 6-hourly or 3-hourly:
 - 6-hourly: Tair, Qair, Wind, PSurf, LWdown
 - 3-hourly: SWdown, Rainf, Snowf
 - Each model will use "its own" elevation, land cover, and soils Routing network and human impacts info available on website netCDF format for input and output data
- A list of current participants (see <http://www.eu-watch.org/nl/25222737-Participants.html>)
 - GWAVA Centre for Ecology and Hydrology (NERC CEH)
 - H08 University of Tokyo / National Institute for Environment Studies
 - HTESSEL Centro de Geofisica da Universidade de Lisboa (FFCUL)
 - Jules UK Meteorological Office (UKMO) / NERC CEH
 - LPJmL Potsdam Institute for Climate Impact Research (PIK)
 - MacPDM University of Reading
 - MATSIRO University of Tokyo
 - Noah University of Texas at Austin
 - Orchidee Laboratoire de Meteorologie Dynamique (LMD)
 - PCR-GLOBWB University of Utrecht (UU)
 - SL scheme/HD model (MPI-HM) Max Planck Institute for Meteorology (MPI-M)
 - VIC VIC community
 - WaterGAP University of Kassel (CESR)
 - WBMplus University of New Hampshire (UNH) / City College of New York (CCNY)